

**Skim Pit Closure Report
for the
Anderson No. 1 Lease Site
Washington County, Colorado
COGCC Remediation #s 8746 and 9050**

Prepared for:

Mr. Terry Pape
HRM Resources, LLC
410 17th Street, Suite 1100
Denver, CO 80202



Nicholson GeoSolutions, LLC
3433 East Lake Drive
Centennial, CO 80121

October 2015

1.0 INTRODUCTION

Nicholson GeoSolutions LLC was retained by HRM Resources, LLC to conduct sampling during skim pit closure at the Anderson No. 1 Lease, an active oil well site located in the NW¹/₄ SW¹/₄ Section 20, T3S, R52W, Washington County, Colorado. Remediation activities were conducted in accordance with the Colorado Oil and Gas Conservation Commission (COGCC) Series 900 Rules.

Form 27 Remediation Work Plans were submitted to the COGCC by the previous operator and HRM. The Form 27s are included in Appendix A of this report.

The site consists of a wellhead, one unlined skim pit, two evaporation pits, a heater-treater, and a tank battery with two 400-bbl storage tanks. The skim pit was closed and associated impacted soil was excavated and transported to the Denver Arapahoe Disposal Landfill operated by Waste Management in Aurora, Colorado for disposal or placed in an on-site landfarm cell for treatment. Closure of the skim pit was performed by Kelly Environmental LLC (Kelly) and Jayhawk Grading, Inc.

This report provides the documentation of activities conducted on November 18-20th, 2014, and June 17th and October 12th, 2015.

2.0 REMEDIATION ACTIVITIES

The following sections discuss the site remediation procedures. Photographs that document the closure of the skim pit and the landfarm cell are included in Appendix B.

Impacted soils were excavated and trucked to the Denver Arapahoe Disposal Landfill for disposal or placed in an on-site landfarm cell for treatment. Appendix C contains a summary of the landfill gatehouse tickets. Visual observations were conducted by Nicholson GeoSolutions during excavation and used to evaluate when the approximate limits of the impacted soils had been reached. Confirmation samples were then collected to assess whether compliance with the COGCC Table 910-1 standards had been achieved. Figure 1 provides the limits of the excavation and the locations of the confirmation samples. The laboratory reports are included in Appendix D.

2.1 Skim Pit Closure and Other Remediation Activities

Closure of the unlined skim pit was initiated on November 18th, 2014. First, the metal cage covering the pit was removed and dismantled. The scrap metal was transported off-site for recycling. Petroleum-contaminated soil was excavated by Kelly to an approximate maximum depth of 24 feet. Approximately 594 yards of soil was excavated and transported to the landfill for disposal during this phase of excavation.

Five confirmation samples were collected from the sidewalls and base of the skim pit excavation on November 19th, 2014 and analyzed for sodium adsorption ratio (SAR), pH, conductivity, Total Volatile Petroleum Hydrocarbons (TVPH – gasoline range), Total Extractable Petroleum Hydrocarbons (TEPH – diesel and motor oil range), and BTEX compounds (benzene, toluene, ethylbenzene, and xylenes). Table 1 provides the analytical results for the confirmation samples. All TPH results for the initial confirmation samples were above the COGCC standard of 500 mg/kg.

Additional excavation of the skim pit was conducted by Jayhawk Grading on June 17th, 2015. The excavation was extended approximately 3 feet further west, two feet further east, 6 feet further south, and 12 feet deeper. Approximately 500 yards of impacted soil was excavated during this phase and placed in an on-site landfarm cell for treatment.

Additional confirmation samples were collected from the south, east, and west walls and the base of the excavation on June 17th, 2015. All results for the additional confirmation samples were below the standards, except for pH for sample Anderson-SP-8. For the north wall of the excavation, which is shared with the adjacent evaporation pit, sample Anderson-SP-4 shows that combined TPH exceeds the COGCC standard at 17,147 mg/kg. This wall cannot be excavated further without undermining the adjacent evaporation pit.

Table 1 Skim Pit Excavation Confirmation Sample Results

Sample ID, Location, and depth	pH	SAR	SC	BTEX	TVPH – Gasoline (mg/kg)	TEPH – Diesel (mg/kg)	TEPH – Motor Oil (mg/kg)
Anderson-SP-1 (west – 12')	NA	NA	NA	Benzene = 0.24	200	14,000	5,700
Anderson-SP-2 (bottom – 24')	NA	NA	NA	Benzene = 0.13	190	5,200	2,400
Anderson-SP-3 (east – 12')	NA	NA	NA	Benzene = 0.094	83	12,000	5,500
Anderson-SP-4 (north – 12')	NA	NA	NA	Benzene = 0.090	47	12,000	5,100
Anderson-SP-5 (south – 12')	NA	NA	NA	Benzene = 0.098	130	10,000	4,200
Anderson-SP-6 (west – 12')	8.1	8.3	1.3	All ND	<0.5	<4.0	<4.0
Anderson-SP-7 (east – 12')	8.8	12	1.1	All ND	<0.5	<4.0	<4.0
Anderson-SP-8 (bottom – 36')	9.7	4.2	0.73	All ND	<0.5	160	45
Anderson-SP-9 (south – 14')	8.6	8.1	1.2	All ND	<0.5	<4.0	<4.0
Table 910-1 Standard	6-9	<12	<4.0		500 ¹	500 ¹	500 ¹

¹The standard is 500 mg/kg for the combined TEPH and TVPH results

Bold values exceed standards ND = Not detected NA = Not analyzed

Confirmation samples were not collected from the foundation soil beneath the skim pit berms. These berms were completely removed and the final skim pit excavation extends beyond the original footprint of the berms in all directions except towards the evaporation pit where the shared wall remains.

2.2 Produced Water and Surface Water Sampling

At the request of the COGCC, a sample of produced water and a downgradient surface water sample from the Anderson No. 1 well were collected on October 12th, 2015 and analyzed for BTEX, chloride, sulfate, and Total Dissolved Solids (TDS). There is no upgradient surface water at this location.

The produced water sample was collected from the discharge hose from the skim tank prior to the evaporation ponds and the surface water sample was collected approximately ½ mile downstream from the evaporation pit outfall where the stream crosses under Colorado Highway 63. Table 2 provides the analytical results for these samples.

Table 2 Anderson No. 1 Water Sample Results

Parameter	EPA Drinking Water Standards	Colorado Aquatic Standards ³	Anderson-PW	Anderson-DOWN
Field Parameters				
specific conductance (uS/cm)			6,330	6,570
pH (standard units)	6.5-8.5 ²	6.5-9.0	8.16	9.06
temperature (°C)			54.3	17.7
General Water Quality Parameters and Anions				
total dissolved solids (mg/l)	500 ²		2,720	3,100
chloride (mg/l)	250 ²		589	773
sulfate (mg/l)	250 ²		<5.0	<5.0
BTEX Compounds				
benzene (mg/l)	0.005 ¹	5.3	0.00458	<0.0005
toluene (mg/l)	10 ¹	17.5	<0.025	<0.005
ethylbenzene (mg/l)	0.7 ¹	32	0.0154	<0.0005
xylenes (mg/l)	10 ¹	C ⁴	0.0866	<0.0015

Bold values exceed standards

¹Federal Drinking Quality Standards Primary Maximum Contaminant Level (MCL)

²Federal Drinking Quality Secondary Standards

³Chronic aquatic life standard (Colorado Water Quality Standards, 5 CCR 1002-31).

⁴Carcinogenic compounds as classified by the EPA

2.3 Data Quality Review

A data quality review was conducted using the quality assurance reports supplied by the laboratory and standard EPA data validation guidance. For both lab reports, all analyses were conducted within the recommended holding times. All method blank results were reported as not detected. All laboratory control sample (LCS), surrogate, laboratory duplicate, and matrix spike/matrix spike duplicate (MS/MSD) recoveries were within the laboratory control limits.

All results are usable for the intended purposes of this remediation.



Appendix A
COGCC Form 27 and COAs

State of Colorado
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109



FOR OGCC USE ONLY

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

OGCC Employee:

Spill Complaint
Inspection NOAV

Tracking No:

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

Spill or Release Plug & Abandon Central Facility Closure Site/Facility Closure Other (describe): _____

OGCC Operator Number: _____

Name of Operator: _____

Address: _____

City: _____ State: _____ Zip: _____

Contact Name and Telephone: _____

No: _____

Fax: _____

API Number: _____

County: _____

Facility Name: _____

Facility Number: _____

Well Name: _____

Well Number: _____

Location: (QtrQtr, Sec, Twp, Rng, Meridian): _____ Latitude: _____ Longitude: _____

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): _____

Site Conditions: Is location within a sensitive area (according to Rule 901e)? Y N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): _____

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: _____

Potential receptors (water wells within 1/4 mi, surface waters, etc.): _____

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check): Extent of Impact: How Determined:

Soils _____ _____

Vegetation _____ _____

Groundwater _____ _____

Surface Water _____ _____

REMEDIALTION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

Describe how source is to be removed:

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:



REMEDIAL WORKPLAN (Cont.)

Tracking Number: _____
Name of Operator: _____
OGCC Operator No: _____
Received Date: _____
Well Name & No: _____
Facility Name & No: _____

OGCC Employee: _____

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

There are no impacts to groundwater.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

The skim pit area will be regraded and evaporation pit berms rebuilt as necessary.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☐ Y ☒ N If yes, describe:

Confirmation samples will be collected from the base and sidewalls of the skim pit excavation to confirm that soil with petroleum levels above the Table 910-1 standards have been removed.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Disposal at the DADS landfill.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: <u>June 5, 2014</u>	Date Site Investigation Completed: <u>June 5, 2014</u>	Date Remediation Plan Submitted: <u>Oct 27, 2014</u>
Remediation Start Date: <u>November 1, 2014</u>	Anticipated Completion Date: <u>Nov 30, 2014</u>	Actual Completion Date: _____

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: David K Nicholson

Signed: DK Nicholson

Title: Consultant to Ritchie Exploration

Date: Oct 27, 2014

OGCC Approved: _____ Title: _____ Date: _____

FORM
27
Rev 6/99

State of Colorado

02086928



Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-2100 Fax:(303)894-2109

FOR OGCC USE ONLY

MAR 30 2015

COGCC

OGCC Employee:

☐ Spill ☐ Complaint
☐ Inspection ☐ NOAV

Tracking No:

SITE INVESTIGATION AND REMEDIATION WORKPLAN

This form shall be submitted to the Director for approval prior to the initiation of site investigation and remediation activities. Form 27 is intended to be used whenever possible. Additional documentation will be required when large volumes of soil and groundwater have been impacted or involve large facilities with multiple source areas. See Rule 910. Attach as many pages as needed to fully describe the proposed work.

CAUSE OF CONDITION BEING INVESTIGATED AND REMEDIATED

☐ Spill or Release ☐ Plug & Abandon ☐ Central Facility Closure ☐ Site/Facility Closure ☒ Other (describe): Skim Pit Closure

OGCC Operator Number: 10548

Name of Operator: HRM Resources II, LLC

Address: 410 17th Street, Suite 1100

City: Denver State: CO Zip: 80202

Contact Name and Telephone:

Terry Pape

No: (970) 768-5700

Fax: (303) 893-6892

API Number: 05-121-07586

County: Washington

Facility Name: Anderson #1

Facility Number: ~~107577~~ 107578

Well Name: Anderson #1

Well Number: 1

Location: (QtrQtr, Sec, Twp, Rng, Meridian): NESW Sec. 20, T3S, R52W, 6PM

Latitude: Longitude:

TECHNICAL CONDITIONS

Type of Waste Causing Impact (crude oil, condensate, produced water, etc): crude oil and produced water

Site Conditions: Is location within a sensitive area (according to Rule 901e)? ☐ Y ☒ N If yes, attach evaluation.

Adjacent land use (cultivated, irrigated, dry land farming, industrial, residential, etc.): agricultural - grazing and cultivated

Soil type, if not previously identified on Form 2A or Federal Surface Use Plan: upland soils derived from glacial till

Potential receptors (water wells within 1/4 mi, surface waters, etc.): none

Description of Impact (if previously provided, refer to that form or document):

Impacted Media (check):

Extent of Impact:

How Determined:



Soils

500 yards

visual inspection



Vegetation



Groundwater



Surface Water

REMEDIATION WORKPLAN

Describe initial action taken (if previously provided, refer to that form or document):

The skim pit was partially excavated in November 2014. Approximately 800 yards of oily soil was transported to the Waste Management Denver-Aurora Disposal Site (DADS) for disposal.

Describe how source is to be removed:

Confirmation samples will be collected to evaluate whether impacted soil remains in the excavation. Remaining impacted soils beneath the skim pit will be excavated and placed in one or more bermed areas on the lease and landfarmed.

Describe how remediation of existing impacts is to be accomplished, including removal and disposal at an injection well or licensed facility, land treatment on site, removal of impacted groundwater, insitu bioremediation, burning of oily vegetation, etc.:

Any remaining impacted soil will be landfarmed on site. Confirmation samples will be collected from the base and sidewalls of the skim pit excavation to confirm that all soils that exceed the Table 910-1 standards for TPH have been removed. Materials placed in the landfarm will be periodically tilled and sampled to evaluate when the Table 910-1 standards have been achieved. The skim pit excavation will be backfilled with the landfarmed soil and clean fill and the evaporation pit berms rebuilt as necessary.



Tracking Number: 2086928
Name of Operator: HRM Resources II, LLC
OGCC Operator No: 10548
Received Date: 3/30/2015
Well Name & No: Anderson 1
Facility Name & No: 107577 oil skim pit

Page 2
REMEDIATION WORKPLAN (Cont.)

OGCC Employee: Robert Young

If groundwater has been impacted, describe proposed monitoring plan (# of wells or sample points, sampling schedule, analytical methods, etc.):

Impacts to groundwater have not been identified at the site.

Describe reclamation plan. Discuss existing and new grade recontouring; method and testing of compaction alleviation; and reseeding program, including location of new seed, seed mix and noxious weed prevention. Attach diagram or drawing. Use additional sheet for description if required.

It is anticipated that no reclamation will be required. The landfarm will be constructed on areas currently used for production activities. After Table 910-1 standards have been achieved, the landfarmed soil and berms will be used to backfill the excavation. Weeds will be controlled by spraying and mechanical removal as necessary.

Attach samples and analytical results taken to verify remediation of impacts. Show locations of samples on an onsite schematic or drawing.

Is further site investigation required? ☒ Y ☐ N If yes, describe:

The landfarm materials will be periodically sampled to evaluate progress in achieving the Table 910-1 standards.

Final disposition of E&P waste (landtreated and disposed onsite, name of licensed disposal facility, recycling, reuse, etc.):

Impacted soils and clean fill will be backfilled into the skim pit excavation once the Table 910-1 standards have been achieved with approval from COGCC.

IMPLEMENTATION SCHEDULE

Date Site Investigation Began: _____ Date Site Investigation Completed: _____ Date Remediation Plan Submitted: April 1, 2015
Remediation Start Date: _____ Anticipated Completion Date: November 1, 2015 Actual Completion Date: _____

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: L. Roger Hutson

Signed: [Signature]

Title: President

Date: 3/25/15

OGCC Approved: [Signature] Title: NE EPS II Date: 5/6/2015

* See Conditions of Approval Correspondence.

Mr. Hutson,

Please find attached the conditionally approved Form 27 (Remediation #9050) for the Anderson 1 oil skim pit remediation. The following conditions of approval (COA) have been added to the Form 27:

Remove petroleum hydrocarbon and produced water impacted soils above Table 910-1 allowable concentrations per Rule 905. Document the disposition of soil impacted above Table 910-1 allowable concentrations. Collect a minimum of one (1) discrete confirmation soil sample from the base and a minimum of four (4) discrete soil samples from the sidewalls of the oil skim pit excavation to document that soils at the extent of the excavation meet the allowable concentrations listed in Table 910-1 for BTEX, TPH, EC, pH and SAR. Oil skim pit berm material can be used to backfill the oil skim pit excavation if it meets the Table 910-1 allowable concentrations for TPH. A minimum of three feet of cover material is required if the berm materials are above the Table 910-1 allowable concentrations for pH, EC and SAR. Collect a minimum of six (6) soil samples from the oil skim pit berm footprint to document that the pH, EC and SAR concentrations of the exposed surface soil comply with Table 910-1 allowable concentrations.

Following the removal of impacted materials, submit a report referencing remediation project #9049 to the COGCC northeast EPS, Rob Young, via email. The report should describe the oil skim pit excavation activities, include a soil sample analytical summary table comparing the soil sample analytical results to Table 910-1 allowable concentrations; analytical laboratory reports; excavation figures showing the original and final extents of the oil skim pit with soil sample locations and depths below ground surface; excavation photographs showing the final excavation extents and sample locations and of the land treatment area showing the placement of the impacted soils and stormwater BMPs. The report shall be due to COGCC no later than [November 1, 2015](#).

The on site land treatment area is subject to the following requirements:

Land treatment of oily waste shall be performed in strict accordance with the requirements of COGCC Rule 907.e.(2). Store stockpiled oily waste in a manner to prevent contamination of surrounding soil, stormwater, surface water and groundwater; until such time that the waste is properly treated or disposed in accordance with COGCC Rule 907.e.

The land treatment of soils on the location will be strictly limited to a three year completion timetable. All soils in the land treatment area will be required to be removed by the end of [May 2018](#). An aggressive and diligent effort will be expected with regard to tilling, application of fertilizer, other soil amendments and water to ensure that bioremediation of the impacted soil is fostered and enhanced in order to meet the deadline.

Prior to using treated material for backfill, submit soil sampling and analytical results verifying that the treated material complies with all contaminants of concern in soil listed on Table 910-1 for COGCC approval. If the backfill material will be covered with at least 3-feet clean cover, analysis of the inorganics (EC, pH, SAR) in soil is not required. For progress and confirmation sampling, collect a minimum of one (1) discrete soil sample from each 100 cubic yards of treated soil. At a minimum, collect soil samples from the treatment area twice per year to establish the rate of biodegradation. Samples shall be collected consistently from the same locations during each sample event.

Prepare and submit a land treatment progress report twice per year consisting of one sampling event in the late spring (May) and one sampling event in the early fall (October). Once the representative soil samples indicate that the soils meet the Table 910-1 allowable concentrations for BTEX, TPH, SAR, EC and pH, the soils can be used to backfill the oil skim pit excavation. If the soils will be under a minimum of three feet of clean cover material, pH, EC and SAR do not have to meet Table 910-1 concentrations. Following the removal of the treated soils, after 3 years or adequate remediation has been achieved, a minimum of four (4) discrete soil samples shall be collected from the footprint of the land treatment area to confirm that the remaining soils comply with the Table 910-1 allowable concentrations for pH, EC, SAR, BTEX and TPH.

Collect a produced water sample for laboratory analysis of BTEX, Total Dissolved Solids, chlorides and sulfates for comparison to an upgradient, background water sample and a surface water sample downstream from the produced water pits. Perform the water sampling and results reporting by [June 30, 2015](#).

Please reference Remediation #9050 on all correspondence regarding this project.

Thank you,

Robert J. Young
Environmental Protection Specialist

P 303.252.0126 | C 720.471.1304 | F 303.252.0472
1120 Lincoln Street, Suite 801, Denver, CO 80203 rob.young@state.co.us | www.colorado.gov/cogcc

Cc: Rem #9050 - Conditions of Approval Correspondence

APPENDIX B

Photographs



Skim pit prior to cleanup



North (shared) wall of excavation



First phase of excavation



Skim pit excavation at conclusion of phase 1



Excavation of additional material



East wall after additional excavation



Excavation of skim pit bottom



North (shared) wall at conclusion of excavation



landfarm cell



landfarm cell



Landfarm cell berms



landfarm cell

APPENDIX C
Landfill Gatehouse Tickets

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
11/20/2014	116678CO	1163414	2271273	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116313	2271272	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116312	2271129	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116310	2271127	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116311	2271125	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116309	2270868	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116308	2270865	E&P EXEMPT HYDROCARBON BEARING	Colorado Landfills - Denver	0.00	18.00	CYD

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
11/20/2014	116678CO	116307	2270860	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING	Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116306	2270858	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116305	2270857	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116303	2270743	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116304	2270737	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116296	2270684	SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
11/20/2014	116678CO	116302	2270680	EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116301	2270677	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116300	2270485	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116299	2270480	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116298	2270479	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116295	2270470	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/20/2014	116678CO	116297	2270466			0.00	18.00	CYD

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
				E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)			
11/19/2014	116678CO	116294	2270282	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116291	2270261	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116292	2270244	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116290	2270239	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116293	2270237	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116289	2270174	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY	Colorado Landfills - Denver Arapahoe	0.00	18.00	CYD

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
11/19/2014	116678CO	116282	2270172	ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Disposal (DADS) Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116283	2270169	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116287	2270161	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116288	2270156	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116286	2269937	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116285	2269934	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD

Date	Profile #	Manifest #	Ticket #	Material	Facility	Tons / Tonnes	Material Quantity	Material Unit
11/19/2014	116678CO	116284	2269879	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116264	2269804	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116262	2269802	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116263	2269799	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116258	2269639	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116259	2269637	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY ENVIRONMENTAL LLC~RITCHIE EXPLORATION INC~116678CO	Colorado Landfills - Denver Arapahoe Disposal (DADS)	0.00	18.00	CYD
11/19/2014	116678CO	116256	2269635	E&P EXEMPT HYDROCARBON BEARING SOIL~KELLY	Colorado Landfills - Denver Arapahoe	0.00	18.00	CYD

APPENDIX D

Laboratory Reports



12065 Lebanon Rd.
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Dave Nicholson
Ritchie Exploration, Inc.- Wichita, KS
8100 E. 22th St. North
Wichita, KS 67226

Report Summary

Wednesday December 03, 2014

Report Number: L735973

Samples Received: 11/26/14

Client Project:

Description:

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

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REPORT OF ANALYSIS

Dave Nicholson
Ritchie Exploration, Inc.- Wichita,
8100 E. 22th St. North
Wichita, KS 67226

December 03, 2014

Date Received : November 26, 2014
Description :

Sample ID : ANDERSON-SP-1

Collected By : DK Nicholson
Collection Date : 11/19/14 13:50

ESC Sample # : L735973-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.24	0.050	mg/kg	8021	12/02/14	100
Toluene	BDL	0.50	mg/kg	8021	12/02/14	100
Ethylbenzene	BDL	0.050	mg/kg	8021	12/02/14	100
Total Xylene	2.3	0.15	mg/kg	8021	12/02/14	100
TPH (GC/FID) Low Fraction	200	10.	mg/kg	8015	12/02/14	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	91.5		% Rec.	8015	12/02/14	1
a,a,a-Trifluorotoluene(PID)	101.		% Rec.	8021	12/02/14	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	14000	200	mg/kg	8015	11/28/14	50
C28-C40 Oil Range	5700	200	mg/kg	8015	11/28/14	50
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	11/28/14	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 12/03/14 11:16 Printed: 12/03/14 11:16
L735973-01 (DRORLA) - Dilution due to matrix



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REPORT OF ANALYSIS

Dave Nicholson
Ritchie Exploration, Inc.- Wichita,
8100 E. 22th St. North
Wichita, KS 67226

December 03, 2014

Date Received : November 26, 2014
Description :

Sample ID : ANDERSON-SP-2

Collected By : DK Nicholson
Collection Date : 11/19/14 13:55

ESC Sample # : L735973-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.13	0.050	mg/kg	8021	12/02/14	100
Toluene	BDL	0.50	mg/kg	8021	12/02/14	100
Ethylbenzene	BDL	0.050	mg/kg	8021	12/02/14	100
Total Xylene	2.1	0.15	mg/kg	8021	12/02/14	100
TPH (GC/FID) Low Fraction	190	10.	mg/kg	8015	12/02/14	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	96.7		% Rec.	8015	12/02/14	1
a,a,a-Trifluorotoluene(PID)	102.		% Rec.	8021	12/02/14	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	5200	200	mg/kg	8015	11/28/14	50
C28-C40 Oil Range	2400	200	mg/kg	8015	11/28/14	50
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	11/28/14	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L735973-02 (DRORLA) - Dilution due to matrix



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REPORT OF ANALYSIS

Dave Nicholson
Ritchie Exploration, Inc.- Wichita,
8100 E. 22th St. North
Wichita, KS 67226

December 03, 2014

Date Received : November 26, 2014
Description :
Sample ID : ANDERSON-SP-3
Collected By : DK Nicholson
Collection Date : 11/19/14 14:00

ESC Sample # : L735973-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.094	0.050	mg/kg	8021	12/02/14	100
Toluene	BDL	0.50	mg/kg	8021	12/02/14	100
Ethylbenzene	BDL	0.050	mg/kg	8021	12/02/14	100
Total Xylene	0.88	0.15	mg/kg	8021	12/02/14	100
TPH (GC/FID) Low Fraction	83.	10.	mg/kg	8015	12/02/14	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.1		% Rec.	8015	12/02/14	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	12/02/14	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	12000	200	mg/kg	8015	11/28/14	50
C28-C40 Oil Range	5500	200	mg/kg	8015	11/28/14	50
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	11/28/14	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L735973-03 (DRORLA) - Dilution due to matrix



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REPORT OF ANALYSIS

Dave Nicholson
Ritchie Exploration, Inc.- Wichita,
8100 E. 22th St. North
Wichita, KS 67226

December 03, 2014

Date Received : November 26, 2014
Description :

Sample ID : ANDERSON-SP-4

Collected By : DK Nicholson
Collection Date : 11/19/14 14:45

ESC Sample # : L735973-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.090	0.050	mg/kg	8021	12/02/14	100
Toluene	BDL	0.50	mg/kg	8021	12/02/14	100
Ethylbenzene	BDL	0.050	mg/kg	8021	12/02/14	100
Total Xylene	0.19	0.15	mg/kg	8021	12/02/14	100
TPH (GC/FID) Low Fraction	47.	10.	mg/kg	8015	12/02/14	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	99.5		% Rec.	8015	12/02/14	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	12/02/14	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	12000	200	mg/kg	8015	11/28/14	50
C28-C40 Oil Range	5100	200	mg/kg	8015	11/28/14	50
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	11/28/14	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 12/03/14 11:16 Printed: 12/03/14 11:16
L735973-04 (DRORLA) - Dilution due to matrix



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REPORT OF ANALYSIS

Dave Nicholson
Ritchie Exploration, Inc.- Wichita,
8100 E. 22th St. North
Wichita, KS 67226

December 03, 2014

Date Received : November 26, 2014
Description :

Sample ID : ANDERSON-SP-5

Collected By : DK Nicholson
Collection Date : 11/19/14 14:50

ESC Sample # : L735973-05

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.098	0.050	mg/kg	8021	12/02/14	100
Toluene	BDL	0.50	mg/kg	8021	12/02/14	100
Ethylbenzene	BDL	0.050	mg/kg	8021	12/02/14	100
Total Xylene	1.4	0.15	mg/kg	8021	12/02/14	100
TPH (GC/FID) Low Fraction	130	10.	mg/kg	8015	12/02/14	100
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.6		% Rec.	8015	12/02/14	1
a,a,a-Trifluorotoluene(PID)	103.		% Rec.	8021	12/02/14	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	10000	200	mg/kg	8015	11/28/14	50
C28-C40 Oil Range	4200	200	mg/kg	8015	11/28/14	50
Surrogate Recovery						
o-Terphenyl	0.00		% Rec.	8015	11/28/14	50

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 12/03/14 11:16 Printed: 12/03/14 11:16
L735973-05 (DRORLA) - Dilution due to matrix

Attachment A
List of Analytes with QC Qualifiers

Sample Number	Work Group	Sample Type	Analyte	Run ID	Qualifier
L735973-01	WG757101	SAMP	o-Terphenyl	R3007149	J7
L735973-02	WG757101	SAMP	o-Terphenyl	R3007149	J7
L735973-03	WG757101	SAMP	o-Terphenyl	R3007149	J7
L735973-04	WG757101	SAMP	o-Terphenyl	R3007149	J7
L735973-05	WG757101	SAMP	o-Terphenyl	R3007149	J7

Attachment B
Explanation of QC Qualifier Codes

Qualifier	Meaning
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.

Qualifier Report Information

ESC utilizes sample and result qualifiers as set forth by the EPA Contract Laboratory Program and as required by most certifying bodies including NELAC. In addition to the EPA qualifiers adopted by ESC, we have implemented ESC qualifiers to provide more information pertaining to our analytical results. Each qualifier is designated in the qualifier explanation as either EPA or ESC. Data qualifiers are intended to provide the ESC client with more detailed information concerning the potential bias of reported data. Because of the wide range of constituents and variety of matrices incorporated by most EPA methods, it is common for some compounds to fall outside of established ranges. These exceptions are evaluated and all reported data is valid and useable "unless qualified as 'R' (Rejected)."

Definitions

- Accuracy - The relationship of the observed value of a known sample to the true value of a known sample. Represented by percent recovery and relevant to samples such as: control samples, matrix spike recoveries, surrogate recoveries, etc.
- Precision - The agreement between a set of samples or between duplicate samples. Relates to how close together the results are and is represented by Relative Percent Difference.
- Surrogate - Organic compounds that are similar in chemical composition, extraction, and chromatography to analytes of interest. The surrogates are used to determine the probable response of the group of analytes that are chemically related to the surrogate compound. Surrogates are added to the sample and carried through all stages of preparation and analyses.
- TIC - Tentatively Identified Compound: Compounds detected in samples that are not target compounds, internal standards, system monitoring compounds, or surrogates.

Summary of Remarks For Samples Printed
12/03/14 at 11:16:56

TSR Signing Reports: 134
R5 - Desired TAT

Sample: L735973-01 Account: RITEXPWKS Received: 11/26/14 09:00 Due Date: 12/04/14 00:00 RPT Date: 12/03/14 11:16
Sample: L735973-02 Account: RITEXPWKS Received: 11/26/14 09:00 Due Date: 12/04/14 00:00 RPT Date: 12/03/14 11:16
Sample: L735973-03 Account: RITEXPWKS Received: 11/26/14 09:00 Due Date: 12/04/14 00:00 RPT Date: 12/03/14 11:16
Sample: L735973-04 Account: RITEXPWKS Received: 11/26/14 09:00 Due Date: 12/04/14 00:00 RPT Date: 12/03/14 11:16
Sample: L735973-05 Account: RITEXPWKS Received: 11/26/14 09:00 Due Date: 12/04/14 00:00 RPT Date: 12/03/14 11:16



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Ritchie Exploration, Inc.- Wichita, KS
Dave Nicholson
8100 E. 22th St. North

Wichita, KS 67226

Quality Assurance Report
Level II

L735973

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1-800-767-5859
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December 03, 2014

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
C10-C28 Diesel Range	< 4	mg/kg			WG757101	11/28/14 16:00
C28-C40 Oil Range	< 4	mg/kg			WG757101	11/28/14 16:00
o-Terphenyl		% Rec.	95.80	50-150	WG757101	11/28/14 16:00
Benzene	< .0005	mg/kg			WG757441	12/02/14 12:51
Ethylbenzene	< .0005	mg/kg			WG757441	12/02/14 12:51
Toluene	< .005	mg/kg			WG757441	12/02/14 12:51
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG757441	12/02/14 12:51
Total Xylene	< .0015	mg/kg			WG757441	12/02/14 12:51
a,a,a-Trifluorotoluene(FID)		% Rec.	102.0	59-128	WG757441	12/02/14 12:51
a,a,a-Trifluorotoluene(PID)		% Rec.	103.0	54-144	WG757441	12/02/14 12:51

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Benzene	mg/kg	.05	0.0529	106.	70-130	WG757441
Ethylbenzene	mg/kg	.05	0.0562	112.	70-130	WG757441
Toluene	mg/kg	.05	0.0563	113.	70-130	WG757441
Total Xylene	mg/kg	.15	0.172	115.	70-130	WG757441
a,a,a-Trifluorotoluene(FID)				102.0	59-128	WG757441
a,a,a-Trifluorotoluene(PID)				103.0	54-144	WG757441
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.96	108.	63.5-137	WG757441
a,a,a-Trifluorotoluene(FID)				100.0	59-128	WG757441
a,a,a-Trifluorotoluene(PID)				106.0	54-144	WG757441

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Benzene	mg/kg	0.0536	0.0529	107.	70-130	1.25	20	WG757441
Ethylbenzene	mg/kg	0.0568	0.0562	114.	70-130	1.04	20	WG757441
Toluene	mg/kg	0.0567	0.0563	113.	70-130	0.780	20	WG757441
Total Xylene	mg/kg	0.173	0.172	116.	70-130	0.720	20	WG757441
a,a,a-Trifluorotoluene(FID)				102.0	59-128			WG757441
a,a,a-Trifluorotoluene(PID)				103.0	54-144			WG757441
TPH (GC/FID) Low Fraction	mg/kg	6.05	5.96	110.	63.5-137	1.49	20	WG757441
a,a,a-Trifluorotoluene(FID)				101.0	59-128			WG757441
a,a,a-Trifluorotoluene(PID)				118.0	54-144			WG757441

Analyte	Units	Matrix Spike				% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV					
C10-C28 Diesel Range	mg/kg	2370	2000	60	610.*		50-100	L735802-01	WG757101
C28-C40 Oil Range	mg/kg	24.9	16.9	60	13.0*		50-100	L735802-01	WG757101
o-Terphenyl					85.50		50-150		WG757101
Benzene	mg/kg	0.236	0.0217	.05	86.0		49.7-127	L736102-26	WG757441
Ethylbenzene	mg/kg	0.187	0.00562	.05	73.0		40.8-141	L736102-26	WG757441
Toluene	mg/kg	0.223	0.00518	.05	87.0		49.8-132	L736102-26	WG757441
Total Xylene	mg/kg	0.598	0.0234	.15	77.0		41.2-140	L736102-26	WG757441
a,a,a-Trifluorotoluene(FID)					98.80		59-128		WG757441
a,a,a-Trifluorotoluene(PID)					99.90		54-144		WG757441
TPH (GC/FID) Low Fraction	mg/kg	20.6	1.12	5.5	71.0		28.5-138	L736102-26	WG757441
a,a,a-Trifluorotoluene(FID)					97.50		59-128		WG757441
a,a,a-Trifluorotoluene(PID)					104.0		54-144		WG757441

* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
C10-C28 Diesel Range	mg/kg	2570	2370	945.*	50-100	8.23	20	L735802-01	WG757101
C28-C40 Oil Range	mg/kg	25.3	24.9	13.9*	50-100	1.71	20	L735802-01	WG757101
o-Terphenyl				92.40	50-150				WG757101
Benzene	mg/kg	0.222	0.236	80.2	49.7-127	6.04	23.5	L736102-26	WG757441
Ethylbenzene	mg/kg	0.156	0.187	60.1	40.8-141	18.3	23.8	L736102-26	WG757441
Toluene	mg/kg	0.201	0.223	78.3	49.8-132	10.3	23.5	L736102-26	WG757441
Total Xylene	mg/kg	0.511	0.598	65.0	41.2-140	15.7	23.7	L736102-26	WG757441
a,a,a-Trifluorotoluene(FID)				101.0	59-128				WG757441
a,a,a-Trifluorotoluene(PID)				102.0	54-144				WG757441
TPH (GC/FID) Low Fraction	mg/kg	19.0	20.6	64.9	28.5-138	8.32	23.6	L736102-26	WG757441
a,a,a-Trifluorotoluene(FID)				97.60	59-128				WG757441
a,a,a-Trifluorotoluene(PID)				103.0	54-144				WG757441

Batch number /Run number / Sample number cross reference

WG757101: R3007149: L735973-01 02 03 04 05
WG757441: R3007677: L735973-01 02 03 04 05

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Ritchie Exploration, Inc.- Wichita, KS
Dave Nicholson
8100 E. 22th St. North

Wichita, KS 67226

Quality Assurance Report
Level II

L735973

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December 03, 2014

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Report Summary

Sunday June 28, 2015

Report Number: L772274

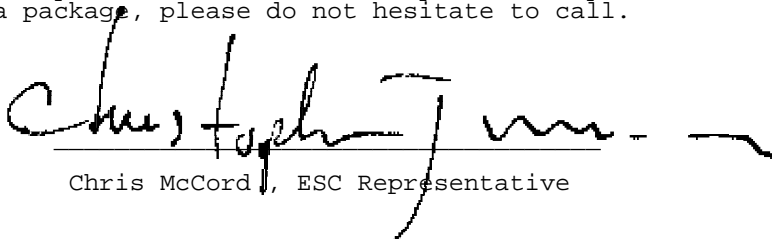
Samples Received: 06/19/15

Client Project:

Description: Anderson No. 1

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:



Chris McCord, ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.

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REPORT OF ANALYSIS

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

June 28, 2015

Date Received : June 19, 2015
Description : Anderson No. 1

Sample ID : ANDERSON-SP-6

Collected By : DK Nicholson
Collection Date : 06/17/15 12:20

ESC Sample # : L772274-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	8.1	0.10	su	9045D	06/20/15	1
Sodium Adsorption Ratio	8.3			Calc.	06/24/15	1
Specific Conductance	1300		umhos/cm	9050AMod	06/25/15	1
Benzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Toluene	BDL	0.025	mg/kg	8021	06/27/15	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/27/15	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/27/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	90.7		% Rec.	8015	06/27/15	1
a,a,a-Trifluorotoluene(PID)	102.		% Rec.	8021	06/27/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	BDL	4.0	mg/kg	8015	06/22/15	1
C28-C40 Oil Range	BDL	4.0	mg/kg	8015	06/22/15	1
Surrogate Recovery						
o-Terphenyl	88.8		% Rec.	8015	06/22/15	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.
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L772274-01 (PH) - 8.1 at 21.3C



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REPORT OF ANALYSIS

Dave Nicholson
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 Denver, CO 80202

June 28, 2015

Date Received : June 19, 2015
 Description : Anderson No. 1
 Sample ID : ANDERSON-SP-7
 Collected By : DK Nicholson
 Collection Date : 06/17/15 12:50

ESC Sample # : L772274-02
 Site ID :
 Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	8.8	0.10	su	9045D	06/20/15	1
Sodium Adsorption Ratio	12.			Calc.	06/24/15	1
Specific Conductance	1100		umhos/cm	9050AMod	06/25/15	1
Benzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Toluene	BDL	0.025	mg/kg	8021	06/27/15	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/27/15	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/27/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	98.6		% Rec.	8015	06/27/15	1
a,a,a-Trifluorotoluene(PID)	92.3		% Rec.	8021	06/27/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	BDL	4.0	mg/kg	8015	06/22/15	1
C28-C40 Oil Range	BDL	4.0	mg/kg	8015	06/22/15	1
Surrogate Recovery						
o-Terphenyl	87.5		% Rec.	8015	06/22/15	1

BDL - Below Detection Limit
 Det. Limit - Practical Quantitation Limit(PQL)
 Note:
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 L772274-02 (PH) - 8.8 at 21.3C



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REPORT OF ANALYSIS

June 28, 2015

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HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Date Received : June 19, 2015
Description : Anderson No. 1
Sample ID : ANDERSON-SP-8
Collected By : DK Nicholson
Collection Date : 06/17/15 13:50

ESC Sample # : L772274-03

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	9.7	0.10	su	9045D	06/20/15	1
Sodium Adsorption Ratio	4.2			Calc.	06/24/15	1
Specific Conductance	730		umhos/cm	9050AMod	06/25/15	1
Benzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Toluene	BDL	0.025	mg/kg	8021	06/27/15	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/27/15	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/27/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.8		% Rec.	8015	06/27/15	1
a,a,a-Trifluorotoluene(PID)	92.0		% Rec.	8021	06/27/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	160	4.0	mg/kg	8015	06/22/15	1
C28-C40 Oil Range	45.	4.0	mg/kg	8015	06/22/15	1
Surrogate Recovery						
o-Terphenyl	84.5		% Rec.	8015	06/22/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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L772274-03 (PH) - 9.7 at 21.3C



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REPORT OF ANALYSIS

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June 28, 2015

Date Received : June 19, 2015
Description : Anderson No. 1
Sample ID : ANDERSON-SP-9
Collected By : DK Nicholson
Collection Date : 06/17/15 14:10

ESC Sample # : L772274-04

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
pH	8.6	0.10	su	9045D	06/20/15	1
Sodium Adsorption Ratio	8.1			Calc.	06/24/15	1
Specific Conductance	1200		umhos/cm	9050AMod	06/25/15	1
Benzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Toluene	BDL	0.025	mg/kg	8021	06/27/15	5
Ethylbenzene	BDL	0.0025	mg/kg	8021	06/27/15	5
Total Xylene	BDL	0.0075	mg/kg	8021	06/27/15	5
TPH (GC/FID) Low Fraction	BDL	0.50	mg/kg	8015	06/27/15	5
Surrogate Recovery-%						
a,a,a-Trifluorotoluene(FID)	97.3		% Rec.	8015	06/27/15	1
a,a,a-Trifluorotoluene(PID)	92.2		% Rec.	8021	06/27/15	1
Diesel and Oil Ranges						
C10-C28 Diesel Range	BDL	4.0	mg/kg	8015	06/22/15	1
C28-C40 Oil Range	BDL	4.0	mg/kg	8015	06/22/15	1
Surrogate Recovery						
o-Terphenyl	64.5		% Rec.	8015	06/22/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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L772274-04 (PH) - 8.6 at 21.3C



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June 28, 2015

Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
TPH (GC/FID) High Fraction	< 4	mg/kg			WG797158	06/21/15 08:53
o-Terphenyl		% Rec.	100.0	50-150	WG797158	06/21/15 08:53
C10-C28 Diesel Range	< 4	mg/kg			WG797217	06/21/15 07:23
C28-C40 Oil Range	< 4	mg/kg			WG797217	06/21/15 07:23
o-Terphenyl		% Rec.	99.90	50-150	WG797217	06/21/15 07:23
Specific Conductance	1.48	umhos/cm			WG798085	06/25/15 06:01
Benzene	< .0005	mg/kg			WG797907	06/26/15 17:13
Ethylbenzene	< .0005	mg/kg			WG797907	06/26/15 17:13
Toluene	< .005	mg/kg			WG797907	06/26/15 17:13
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG797907	06/26/15 17:13
Total Xylene	< .0015	mg/kg			WG797907	06/26/15 17:13
a,a,a-Trifluorotoluene(FID)		% Rec.	91.20	59-128	WG797907	06/26/15 17:13
a,a,a-Trifluorotoluene(PID)		% Rec.	102.0	54-144	WG797907	06/26/15 17:13
Benzene	< .0005	mg/kg			WG798852	06/27/15 12:50
Ethylbenzene	< .0005	mg/kg			WG798852	06/27/15 12:50
Toluene	< .005	mg/kg			WG798852	06/27/15 12:50
TPH (GC/FID) Low Fraction	< .1	mg/kg			WG798852	06/27/15 12:50
Total Xylene	< .0015	mg/kg			WG798852	06/27/15 12:50
a,a,a-Trifluorotoluene(FID)		% Rec.	100.0	59-128	WG798852	06/27/15 12:50
a,a,a-Trifluorotoluene(PID)		% Rec.	94.10	54-144	WG798852	06/27/15 12:50

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
pH	su	6.50	6.50	0.460	1	L772142-01	WG797150
pH	su	8.80	8.90	0.676	1	L772349-03	WG797150
Specific Conductance	umhos/cm	1300	1300	1.53	20	L772274-01	WG798085
Specific Conductance	umhos/cm	28.0	28.0	0.357	20	L772880-08	WG798085

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
TPH (GC/FID) High Fraction	mg/kg	60	53.8	89.6	50-150	WG797158
o-Terphenyl				96.60	50-150	WG797158
C10-C28 Diesel Range	mg/kg	60	42.9	71.4	50-100	WG797217
o-Terphenyl				97.60	50-150	WG797217
pH	su	5.63	5.62	99.8	98.2-101.8	WG797150
Specific Conductance	umhos/cm	534	536.	100.	85-115	WG798085
Benzene	mg/kg	.05	0.0418	83.7	70-130	WG797907
Ethylbenzene	mg/kg	.05	0.0455	91.0	70-130	WG797907
Toluene	mg/kg	.05	0.0443	88.6	70-130	WG797907

* Performance of this Analyte is outside of established criteria.

For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Quality Assurance Report
 Level II
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June 28, 2015

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Total Xylene	mg/kg	.15	0.135	90.1	70-130	WG797907
a,a,a-Trifluorotoluene(PID)				101.0	54-144	WG797907
TPH (GC/FID) Low Fraction	mg/kg	5.5	5.14	93.4	63.5-137	WG797907
a,a,a-Trifluorotoluene(FID)				98.60	59-128	WG797907
Benzene	mg/kg	.05	0.0451	90.3	70-130	WG798852
Ethylbenzene	mg/kg	.05	0.0459	91.9	70-130	WG798852
Toluene	mg/kg	.05	0.0459	91.7	70-130	WG798852
Total Xylene	mg/kg	.15	0.137	91.4	70-130	WG798852
a,a,a-Trifluorotoluene(FID)				99.50	59-128	WG798852
a,a,a-Trifluorotoluene(PID)				102.0	54-144	WG798852
TPH (GC/FID) Low Fraction	mg/kg	5.5	4.78	86.9	63.5-137	WG798852
a,a,a-Trifluorotoluene(FID)				100.0	59-128	WG798852
a,a,a-Trifluorotoluene(PID)				108.0	54-144	WG798852

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
TPH (GC/FID) High Fraction	mg/kg	54.8	53.8	91.0	50-150	1.82	20	WG797158
o-Terphenyl				98.50	50-150			WG797158
C10-C28 Diesel Range	mg/kg	43.0	42.9	72.0	50-100	0.250	20	WG797217
o-Terphenyl				98.30	50-150			WG797217
pH	su	5.62	5.62	100.	98.2-101.8	0.0	20	WG797150
Specific Conductance	umhos/	536.	536.	100.	85-115	0.0	20	WG798085
Benzene	mg/kg	0.0423	0.0418	84.0	70-130	1.02	20	WG797907
Ethylbenzene	mg/kg	0.0459	0.0455	92.0	70-130	0.820	20	WG797907
Toluene	mg/kg	0.0443	0.0443	88.0	70-130	0.0200	20	WG797907
Total Xylene	mg/kg	0.136	0.135	91.0	70-130	0.870	20	WG797907
a,a,a-Trifluorotoluene(PID)				101.0	54-144			WG797907
TPH (GC/FID) Low Fraction	mg/kg	5.16	5.14	94.0	63.5-137	0.490	20	WG797907
a,a,a-Trifluorotoluene(FID)				98.70	59-128			WG797907
Benzene	mg/kg	0.0487	0.0451	97.0	70-130	7.53	20	WG798852
Ethylbenzene	mg/kg	0.0495	0.0459	99.0	70-130	7.56	20	WG798852
Toluene	mg/kg	0.0492	0.0459	98.0	70-130	6.99	20	WG798852
Total Xylene	mg/kg	0.147	0.137	98.0	70-130	6.95	20	WG798852
a,a,a-Trifluorotoluene(FID)				99.90	59-128			WG798852
a,a,a-Trifluorotoluene(PID)				101.0	54-144			WG798852
TPH (GC/FID) Low Fraction	mg/kg	4.53	4.78	82.0	63.5-137	5.47	20	WG798852
a,a,a-Trifluorotoluene(FID)				99.40	59-128			WG798852
a,a,a-Trifluorotoluene(PID)				108.0	54-144			WG798852

Analyte	Units	Matrix Spike			% Rec	Limit	Ref Samp	Batch
		MS Res	Ref Res	TV				
TPH (GC/FID) High Fraction	mg/kg	53.1	1.08	60	87.0	50-150	L772274-01	WG797158
o-Terphenyl					90.50	50-150		WG797158

* Performance of this Analyte is outside of established criteria.
 For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'



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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
C10-C28 Diesel Range	mg/kg	47.8	0.0	60	80.0	50-100	L772274-01	WG797217
o-Terphenyl					97.90	50-150		WG797217
Benzene	mg/kg	0.226	0.000247	.05	90.0	49.7-127	L771991-02	WG797907
Ethylbenzene	mg/kg	0.243	0.000645	.05	97.0	40.8-141	L771991-02	WG797907
Toluene	mg/kg	0.235	0.00149	.05	94.0	49.8-132	L771991-02	WG797907
Total Xylene	mg/kg	0.715	0.00448	.15	95.0	41.2-140	L771991-02	WG797907
a,a,a-Trifluorotoluene(PID)					101.0	54-144		WG797907
TPH (GC/FID) Low Fraction	mg/kg	23.7	0.0	5.5	86.0	28.5-138	L771991-02	WG797907
a,a,a-Trifluorotoluene(FID)					97.20	59-128		WG797907
Benzene	mg/kg	0.215	0.000567	.05	86.0	49.7-127	L772274-02	WG798852
Ethylbenzene	mg/kg	0.217	0.0	.05	87.0	40.8-141	L772274-02	WG798852
Toluene	mg/kg	0.218	0.00137	.05	87.0	49.8-132	L772274-02	WG798852
Total Xylene	mg/kg	0.653	0.00252	.15	87.0	41.2-140	L772274-02	WG798852
a,a,a-Trifluorotoluene(FID)					98.10	59-128		WG798852
a,a,a-Trifluorotoluene(PID)					99.30	54-144		WG798852
TPH (GC/FID) Low Fraction	mg/kg	22.7	0.0	5.5	82.0	28.5-138	L772274-02	WG798852
a,a,a-Trifluorotoluene(FID)					99.50	59-128		WG798852
a,a,a-Trifluorotoluene(PID)					108.0	54-144		WG798852

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
TPH (GC/FID) High Fraction	mg/kg	55.3	53.1	90.4	50-150	4.13	20	L772274-01	WG797158
o-Terphenyl				95.00	50-150				WG797158
C10-C28 Diesel Range	mg/kg	51.6	47.8	85.9	50-100	7.65	20	L772274-01	WG797217
o-Terphenyl				97.70	50-150				WG797217
Benzene	mg/kg	0.189	0.226	75.6	49.7-127	17.7	23.5	L771991-02	WG797907
Ethylbenzene	mg/kg	0.203	0.243	81.0	40.8-141	17.9	23.8	L771991-02	WG797907
Toluene	mg/kg	0.198	0.235	78.6	49.8-132	17.2	23.5	L771991-02	WG797907
Total Xylene	mg/kg	0.634	0.715	83.9	41.2-140	12.0	23.7	L771991-02	WG797907
a,a,a-Trifluorotoluene(PID)				97.60	54-144				WG797907
TPH (GC/FID) Low Fraction	mg/kg	24.1	23.7	87.5	28.5-138	1.65	23.6	L771991-02	WG797907
a,a,a-Trifluorotoluene(FID)				97.50	59-128				WG797907
Benzene	mg/kg	0.229	0.215	91.5	49.7-127	6.40	23.5	L772274-02	WG798852
Ethylbenzene	mg/kg	0.231	0.217	92.3	40.8-141	6.18	23.8	L772274-02	WG798852
Toluene	mg/kg	0.232	0.218	92.2	49.8-132	6.09	23.5	L772274-02	WG798852
Total Xylene	mg/kg	0.685	0.653	91.0	41.2-140	4.73	23.7	L772274-02	WG798852
a,a,a-Trifluorotoluene(FID)				98.40	59-128				WG798852
a,a,a-Trifluorotoluene(PID)				100.0	54-144				WG798852
TPH (GC/FID) Low Fraction	mg/kg	21.8	22.7	79.4	28.5-138	3.86	23.6	L772274-02	WG798852
a,a,a-Trifluorotoluene(FID)				99.10	59-128				WG798852
a,a,a-Trifluorotoluene(PID)				108.0	54-144				WG798852

Batch number /Run number / Sample number cross reference

WG797158: R3044858: L772274-01 02 03 04

WG797217: R3044880 R3045097: L772274-01 02 03 04

WG797150: R3044898: L772274-01 02 03 04

* Performance of this Analyte is outside of established criteria.

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Quality Assurance Report
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L772274

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WG797144: R3045369: L772274-01 02 03 04
WG798085: R3045733: L772274-01 02 03 04
WG797907: R3046251: L772274-01
WG798852: R3046279: L772274-02 03 04

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The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.



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Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Report Summary

Wednesday October 21, 2015

Report Number: L794314

Samples Received: 10/14/15

Client Project:

Description: Anderson

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197,
FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016,
NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002,
SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612,
MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1,
TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

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REPORT OF ANALYSIS

October 21, 2015

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Date Received : October 14, 2015
Description : Anderson
Sample ID : ANDERSON-PW
Collected By : DK Nicholson
Collection Date : 10/12/15 13:50

ESC Sample # : L794314-01

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	589.	10.0	mg/l	9056MOD	10/16/15	10
Sulfate	BDL	5.00	mg/l	9056MOD	10/16/15	1
Dissolved Solids	2720	10.0	mg/l	2540 C-2011	10/20/15	1
Benzene	0.00458	0.00250	mg/l	8021B	10/18/15	5
Toluene	BDL	0.0250	mg/l	8021B	10/18/15	5
Ethylbenzene	0.0154	0.00250	mg/l	8021B	10/18/15	5
Total Xylene	0.0866	0.00750	mg/l	8021B	10/18/15	5
Surrogate Recovery(%) a,a,a-Trifluorotoluene(PID)	97.7		% Rec.	8021B	10/18/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

The reported analytical results relate only to the sample submitted.

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Reported: 10/21/15 15:58 Printed: 10/21/15 15:58



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REPORT OF ANALYSIS

October 21, 2015

Dave Nicholson
HRM Resources, LLC - Denver, CO
410 17th Street, Suite 1100
Denver, CO 80202

Date Received : October 14, 2015
Description : Anderson
Sample ID : ANDERSON-DOWN
Collected By : DK Nicholson
Collection Date : 10/12/15 14:10

ESC Sample # : L794314-02

Site ID :

Project # :

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Chloride	773.	50.0	mg/l	9056MOD	10/16/15	50
Sulfate	BDL	5.00	mg/l	9056MOD	10/16/15	1
Dissolved Solids	3110	10.0	mg/l	2540 C-2011	10/20/15	1
Benzene	BDL	0.000500	mg/l	8021B	10/18/15	1
Toluene	BDL	0.00500	mg/l	8021B	10/18/15	1
Ethylbenzene	BDL	0.000500	mg/l	8021B	10/18/15	1
Total Xylene	BDL	0.00150	mg/l	8021B	10/18/15	1
Surrogate Recovery(%) a,a,a-Trifluorotoluene(PID)	97.8		% Rec.	8021B	10/18/15	1

BDL - Below Detection Limit

Det. Limit - Practical Quantitation Limit(PQL)

Note:

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Reported: 10/21/15 15:58 Printed: 10/21/15 15:58



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Analyte	Result	Laboratory Blank		Limit	Batch	Date Analyzed
		Units	% Rec			
Chloride	< 1	mg/l			WG822295	10/16/15 01:28
Sulfate	< 5	mg/l			WG822295	10/16/15 01:28
Benzene	< .0005	mg/l			WG822052	10/18/15 13:07
Ethylbenzene	< .0005	mg/l			WG822052	10/18/15 13:07
Toluene	< .005	mg/l			WG822052	10/18/15 13:07
Total Xylene	< .0015	mg/l			WG822052	10/18/15 13:07
a,a,a-Trifluorotoluene(PID)		% Rec.	98.00	55-122	WG822052	10/18/15 13:07
Dissolved Solids	< 10	mg/l			WG822213	10/20/15 12:58

Analyte	Units	Duplicate		RPD	Limit	Ref Samp	Batch
		Result	Duplicate				
Chloride	mg/l	59.4	59.2	0.00	20	L794310-03	WG822295
Sulfate	mg/l	790.	788.	0.00	20	L794310-03	WG822295
Sulfate	mg/l	987.	917.	7.00	20	L794372-04	WG822295
Chloride	mg/l	9.17	9.18	0.00	20	L794372-04	WG822295
Dissolved Solids	mg/l	3130	3110	0.641	5	L794314-02	WG822213

Analyte	Units	Laboratory Control Sample		% Rec	Limit	Batch
		Known Val	Result			
Chloride	mg/l	40	39.8	99.0	90-110	WG822295
Sulfate	mg/l	40	40.1	100.	90-110	WG822295
Benzene	mg/l	.05	0.0476	95.2	70-130	WG822052
Ethylbenzene	mg/l	.05	0.0466	93.2	70-130	WG822052
Toluene	mg/l	.05	0.0470	94.1	70-130	WG822052
Total Xylene	mg/l	.15	0.141	93.9	70-130	WG822052
a,a,a-Trifluorotoluene(PID)				97.00	55-122	WG822052
Dissolved Solids	mg/l	8800	8650	98.3	85-115	WG822213

Analyte	Units	Laboratory Control Sample Duplicate			Limit	RPD	Limit	Batch
		Result	Ref	%Rec				
Chloride	mg/l	39.7	39.8	99.0	90-110	0.00	20	WG822295
Sulfate	mg/l	39.9	40.1	100.	90-110	0.00	20	WG822295
Benzene	mg/l	0.0463	0.0476	93.0	70-130	2.68	20	WG822052
Ethylbenzene	mg/l	0.0457	0.0466	91.0	70-130	1.87	20	WG822052
Toluene	mg/l	0.0454	0.0470	91.0	70-130	3.43	20	WG822052
Total Xylene	mg/l	0.138	0.141	92.0	70-130	1.88	20	WG822052
a,a,a-Trifluorotoluene(PID)				97.90	55-122			WG822052
Dissolved Solids	mg/l	8580	8650	98.0	85-115	0.813	5	WG822213

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Analyte	Units	MS Res	Matrix Spike		% Rec	Limit	Ref Samp	Batch
			Ref Res	TV				
Chloride	mg/l	62.2	12.7	50	99.0	80-120	L794354-06	WG822295
Sulfate	mg/l	72.2	23.4	50	97.0	80-120	L794354-06	WG822295
Chloride	mg/l	62.0	13.2	50	98.0	80-120	L794398-07	WG822295
Sulfate	mg/l	51.4	2.11	50	99.0	80-120	L794398-07	WG822295
Benzene	mg/l	0.0461	0.0000847	.05	92.0	57.2-131	L794153-03	WG822052
Ethylbenzene	mg/l	0.0454	0.0000891	.05	90.5	67.5-135	L794153-03	WG822052
Toluene	mg/l	0.0456	0.000209	.05	90.8	63.7-134	L794153-03	WG822052
Total Xylene	mg/l	0.138	0.000371	.15	91.6	65.9-138	L794153-03	WG822052
a,a,a-Trifluorotoluene(PID)					97.30	55-122		WG822052

Analyte	Units	MSD	Matrix Spike Duplicate		Limit	RPD	Limit	Ref Samp	Batch
			Ref	%Rec					
Chloride	mg/l	61.9	62.0	97.4	80-120	0.00	20	L794398-07	WG822295
Sulfate	mg/l	51.2	51.4	98.3	80-120	0.00	20	L794398-07	WG822295
Benzene	mg/l	0.0442	0.0461	88.3	57.2-131	4.13	20	L794153-03	WG822052
Ethylbenzene	mg/l	0.0434	0.0454	86.7	67.5-135	4.35	20	L794153-03	WG822052
Toluene	mg/l	0.0434	0.0456	86.5	63.7-134	4.84	20	L794153-03	WG822052
Total Xylene	mg/l	0.132	0.138	87.7	65.9-138	4.42	20	L794153-03	WG822052
a,a,a-Trifluorotoluene(PID)				97.40	55-122				WG822052

Batch number /Run number / Sample number cross reference

WG822295: R3085936: L794314-01 02
WG822052: R3086464: L794314-01 02
WG822213: R3086471: L794314-01 02

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Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.